Comment Resolution Form
North IPT – Environmental Restoration

Document: Abbreviated Work plan June2018 Vertical Profile Boring (VPB177) / Recovery Well (RW4) Installation for RE108 Hot Spot, NWIRP Bethpage	**Version** / Final	**Document Receipt Date**: 12 June 2018
Review Comments By: Brian Murray, RPM	**Phone**: 757-641-0491	**Note: Discussion provided by Resolution Consultants, March 6, 2018**

Comment Number	Page #	Line, Section, Figure or Table	Comment	Imp Comm	Imp Comm	Discussion
1	1	Paragraph 2	Scope and Objectives, Second Paragraph, the last sentence states: "During the drilling of the recovery well, the lithology will be logged to assess the future locations and construction of the RE108 hot spot recovery well(s)." What is intended by this sentence? Is this sentence referring to an additional Phase 1 recovery well or to the Phase 2 recovery wells?	X		This sentence has been deleted.
2		Bullet 2	Scope and Objectives, 2nd bullet. The second sentence should be revised by inserting "a" between "and" and "groundwater".	X		Text revised as stated.
3		Figure 3	The report text references Figure 3, but no Figure 3 is included in the Work Plan.	X		Reference to Figure 3 removed.
4		Figure 1.	The report text indicates that Figure 1 illustrates the site location relative to Long Island, but Figure 1 is a local map showing the RE108 and RW4 area.	X		Reference to regional has been removed.
5	5	1st Paragraph.	Page 5, Recovery Well Installation, First Paragraph. A section of sump should be installed immediately below the well screen.	X		Text revised as stated.
6	6	1st Paragraph.	Page 6, Recovery Well Development, First Paragraph. The last sentence should be revised to state "….be approved by Resolution, in consultation with NYSDEC, prior to implementation".	X		Text revised as stated.
7	6	2nd Paragraph	Recovery Well Development, Second Paragraph. The second and third sentences should be revised to state "…. manually; drawdown will also be measured during and following equilibration after development. Water samples from the development activities (anticipated to be one pre- and one post-development) will be collected by Resolution and development water will be discharged….".	X		Text revised as stated.
8	6	3rd Paragraph	Page 6, Installation of the Vault, Third Paragraph. What does "loose bottom" refer to in the second sentence?			It refers to use of gravel. The bottom or top of the vault will not be made of solid concrete.
9		Figure 2	Figure 2 is stamped "DRAFT".	X		Draft has been removed.

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10		Figure 1 and 2	Although it is not groundwater data collected from a permanent monitoring well, the location of the 1,000 ppb contour on Figure 2 should be adjusted by using the data collected from VPB-166. In addition, the 500 ppb contour should also be shown on this figure.	X		Data from VPB166 and the 500 ppb contour has been added.
11		Figure 2	Figure 2 shows the highest TCE concentrations occurring in groundwater east of the proposed RW4 location. Based on this, should the proposed RW4 location be moved to the east? Overall, the 1,000 ppb contour included in the RW4 Work Plan is considerably different than the 1,000 ppb contour included in the 30% Basis of Design Report and the recently submitted (June 8, 2018) Draft Work Plan Phase I RE108 Area Hotspot Treatment System.	X		The recovery well has been moved slightly east to more accurately reflect the proposed location. With the exception of the VPB166 data, the contour for the 1,000 ppb and 500 ppb is based on recent groundwater monitoring data collected December 2017.
12			Prior to constructing Recovery Well RW4, please discuss the groundwater, soil, and geophysical data used to design RW4 with Department staff	X		"Prior to well construction Resolution will discuss the groundwater, soil and geophysical data used to design RW4 with the NYSDEC." Has been added in Recovery Well Installation section.
13			The schedule shows the drilling of RW4 being completed in mid-to-late December 2018. However, recent discussions with the Navy have suggested that the Phase I RE-108 Area Groundwater Extraction and Treatment System will be operational by the end of 2018. Is the end of 2018 operating schedule still accurate?	X		The schedule is still correct; it is anticipated to have RW4 online, weather permitting, by mid- to late December 2018.
14			Consistent with current VPB and monitoring well drilling procedures in the area, please plan on delivering drilling notices to nearby residents. Please include the Department and NYSDOH project managers on the drilling notices.			Notices will be sent prior to start of work, and NYSDEC and NYSDOH will be provided with notices.
			Remove Reference to VPB			Reference are removed

ABBREVIATED WORK PLAN – OCTOBER 2018
RECOVERY WELL (RW4) INSTALLATION FOR RE108 HOT SPOT
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP), BETHPAGE, NEW YORK

This abbreviated work plan has been prepared by Resolution Consultants (Resolution) for the Mid-Atlantic Division of the Naval Facilities Engineering Command (NAVFAC) pursuant to Contract Task Order (CTO) WE80, issued under Comprehensive Long-term Environmental Action Navy (CLEAN) contract number N62470-11-D-8013. This investigation is being conducted to better define the local aquifer hydrogeology and to support the remedial design for the RE108 hot spot treatment system of the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, Long Island, New York (Figure 1).

Scope and Objectives

The objective of the field investigation is to further characterize the local aquifer and develop hydrogeological parameters needed to design a recovery well(s). The recovery well(s) is intended to hydraulically capture the RE108 hot spot groundwater contamination that is depicted by TCE contours in Figure 2. Regional groundwater flow is south-southeast, but is locally affected by the operation of recharge basins and public water supply wells (Resolution, 2012).

This investigation will consist of the following tasks:

- Drilling, logging, and sampling of one recovery well. In addition, a continuous lithologic log will be constructed based on drill cuttings, and split spoon samples will be periodically collected through the planned recovery well screen interval of 550 to 650 feet below ground surface (ft bgs).

- Installation of one 12-inch recovery well to a depth of approximately 655 ft bgs. The permanent recovery well will be surveyed and a groundwater grab sample will be collected each for pre- and post development of the well for volatile organic compounds (VOCs) analysis using Environmental Protection Agency (EPA) Method 8260C.

- Installation of an underground vault 6 ft wide by 7 ft deep by 8 ft long in size.

The recovery well depth, slot size, and screen interval will be based on the data from the surrounding wells and vertical profile borings (VPBs), including geophysical data.

The recovery well designated as RW4 is located 1.9 miles south of the NWIRP Bethpage and Northrop Grumman Corporation (NG) parcels. The worksite will be situated south of 274 Hicksville

Road adjacent to a fenced lot. (See Figure 3) The boring location is not fenced and has open access from Hicksville Road in Bethpage, NY. Figure 1 provides the location of the proposed recovery well, and the location of the area of study.

Site History

NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City. NWIRP Bethpage is in the Hamlet of Bethpage, Town of Oyster Bay, New York. Since its inception in 1941, the plant's primary mission was research prototyping, testing, design engineering, fabrication, and primary assembly of military aircraft. The facilities at NWIRP included four plants used for assembly and prototype testing, a group of quality control laboratories, two warehouse complexes (north and south), a salvage storage area, water recharge basins, the Industrial Wastewater Treatment Plant, and several smaller support buildings.

The Navy's property originally totaled 109.5 acres and was formerly a Government-Owned Contractor-Operated (GOCO) facility that was operated by NG until September 1998. Prior to 2002, the NWIRP property was bordered on the north, west, and south by current or former NG facilities, and on the east by a residential neighborhood. By March 2008, approximately 100 acres of NWIRP property were transferred to Nassau County in three separate actions. The remaining 9 acres and access easements were retained by the Navy to continue remedial efforts at Installation Restoration (IR) Site 1 – Former Drum Marshalling Area and Site 4 – Former Underground Storage Tanks (Area of Concern [AOC] 22). A parcel of land connecting the two sites was also retained. Currently, the 9-acre parcel of NWIRP is bordered on the east by the residential neighborhood and on the north, south, and west by Nassau County property. Access to the NWIRP is from South Oyster Bay Road.

The hot spot area was confirmed in 2011 by the presence of trichloroethene (TCE) in groundwater at concentrations greater than 1,000 parts per billion (ppb) in the Bethpage Water District Plant 6 wells. During the course of further investigation led by Resolution, VPB142 and associated wells RE108D1 and RE108D2 were installed in October 2013. The subsequent consecutive quarterly groundwater sampling results established the boundaries of the present RE108 hot spot location. The hot spot plume is approximately 4,500 ft long by 1,990 ft wide as shown in Figure 2, and 500 to 800 feet deep.

Field Investigation Task Plan

Details of the field investigation are provided below. Performance of the field investigation will follow the Navy's *Uniform Federal Policy Sampling and Analysis Plan (UFP SAP) Addendum – VPB and Recovery Well Installation and Sampling* (Resolution, 2016).

Recovery Well

The recovery well will be drilled to a depth of approximately 655 ft bgs. To prevent sloughing of the upper borehole, an auger rig will be used to over-drill the borehole to 11 inches in diameter and install a temporary, steel surface casing. The well borehole will be constructed using reverse circulation drilling technique with the casings installed plumb and true to line. The anticipated finished depth of the well will be approximately 655 ft bgs. (see Table 3) An example of the well construction diagram is presented in Attachment A.

Soil Sampling during Recovery Well Installation

Samples of the drill cuttings will be logged by the geologist to construct a descriptive lithologic log of the entire bore hole.

Up to 12 split spoon samples will be collected from ground surface to a depth of 655 ft. Samples will be collected when a change in geology is observed in the field. Samples will be logged by the field geologist and screened for VOCs utilizing a photoionization detector (PID). Up to two soil samples for total organic carbon (TOC) analysis will be collected.

During the advancement of the well, five (5) split spoon samples may be collected for purposes of logging in the screened interval and may be submitted for grain size by Resolution. (See Table 2). For the purpose of this scope, a maximum screen length of 100 ft (550 to 650 ft bgs) is assumed.

Air Monitoring

Resolution will perform air monitoring for site-related contaminants during the recovery well drilling and well completion, and will direct personnel as to the minimum level of personal protective equipment (PPE) to be worn. One air sample per boring (see Table 1) will be collected to document ambient levels of VOCs in the work area air during installation of the recovery well. A community air monitoring plan (CAMP) will also be followed during installation of the recovery well; details of the CAMP are provided in the *Health and Safety Plan – Site 1 OU-2 Off Site TCE Groundwater Plume Investigation* (Resolution, 2012) which follows procedures outlined by the New York State Department of Environmental Conservation (NYSDEC) DER-10.

At a minimum, personnel will work in modified Level D protection. Upgrading to Level C is not anticipated, but is specified in the *Health and Safety Plan* (HASP) as a contingency for some portions of the work specified herein.

Recovery Well Installation

The RW4 will be installed using the reverse circulation drilling technique. The 12-inch well is anticipated to be used as part of the final groundwater extraction system. Prior to well construction (well depth, well screen, length and slot size), Resolution will discuss the results of the groundwater, soil, and geophysical data used to design RW4 with the NYSDEC. The well will be installed in an 18-inch diameter borehole and consist of 12-inch schedule 40 black steel casing, 100 ft (screen length assumed) of 12-inch ID Hi-Flow 304 stainless steel well screen, filter pack, sand and bentonite seals, and grout. A 5-foot sump will be installed immediately below the well screen. The well will be finished in an underground vault that is 6 ft wide by 7 ft deep by 8 ft long in size.

For the purpose of this scope, a maximum screen length of 100 ft is assumed. Threaded bottom caps will be fitted to the bottom of the well. Well centralizers will be installed at an interval of approximately 40 to 50 ft. A permanent 20-inch steel surface casing (60 ft in depth) set in concrete will be used to support the upper borehole walls. The well will include a submersible or turbine pump with a pumping capacity of 400 to 700 gallons per minute (gpm). The details of well construction are provided in Attachment A. The anticipated finished depth of the well will be approximately 655 feet (See Table 3 for details).

- For the purposes of this work plan, the filter pack is anticipated to consist of #1 quartz sand installed using a tremie pipe. The well gravel pack will be placed a minimum of 25 feet above top of screen.

- A fine sand layer (finer than gravel pack) will be placed in the annulus on top of the gravel pack in the same manner as the gravel pack, approximately 15 feet thick above the top of the gravel pack.

- A 4- to 8-foot thick bentonite seal will be installed above the fine sand layer. The annulus above the bentonite seal will be grouted with Volclay© (or similar) high-solids bentonite slurry. Both the bentonite seal and bentonite slurry will be installed using a tremie pipe. The well will be completed at the surface with a locking curb box, set in an underground vault 6 ft wide by 7 ft deep by 8 ft long in size (vault construction is described below). A layer of fine sand will be installed above the grout slurry and inside the curb box to allow for drainage of water from the curb box. The top of well riser will be set approximately 6 inches below grade. A lockable gripper cap will be installed on the well riser top.

Recovery Well Development

Following installation, RW4 will be developed to evacuate drilling mud, silts and other fine-grained sediments which may have accumulated within the well during its installation. Well development will not commence until at least 24 hours after well installation. Due to the depth of the well, it is anticipated that the well will be developed using air lift methods and over pumping using a submersible pump. The drilling subcontractor will provide the pump needed to develop the well.

Development will continue until turbidity has stabilized (less than 50 nephelometric turbidity units [NTU] if possible). Special care will be taken to develop the well properly in order to ensure adequate hydraulic connection between RW4 and the aquifer. An alternate and equally effective method or variation may be used to develop the well if required, but must be approved by Resolution in consultation with the NYSDEC prior to implementation.

The recovery well will be developed at a rate similar to the pumping rate of 400 gpm. The specific capacity of the well (discharge rate/feet of drawdown) will be measured manually; drawdown will also be measured during and following equilibration after development. Water from the development activities (anticipated to be one pre- and one post-development) will be sampled by Resolution and development water will be discharged directly to conveyance piping to the GM-38 treatment system. The aqueous grab sample will be analyzed by a New York State and Navy-approved laboratory for the Target Compound List (TCL) using EPA Methods as per the following:

Analytes	EPA Method of Testing
Volatile Organic Compounds (VOCs)	8260C
Semi Volatile Organic Compounds (SVOCs)	8270D
Total Suspended Solids (TSS)	2540D
pH	4500_H+B
Biological Oxygen Demand (BOD)	5210B
Total Dissolved Solids (TDS)	2540C
Total Kjehldahl Nitrogen (TKN)	351.2
Ammonia	350.1
1,4-Dioxane	8270D SIM
Total Metals/Dissolved Metals	6020A/7470A

Installation of the Vault

Following the installation of RW4, an underground vault will be installed housing the well. The vault will be 6 ft wide by 7 ft deep by 8 ft long, precast with loose gravel bottom and loose H20 rated top including one (1) 24-inch manhole over well and one (1) 24-inch manhole with ladder and wall sleeves for the 6-inch main and future electric conduit.

The vault will be installed with a 6-inch flanged gate valve, 6-inch flanged check valve and 6 inch flanged flow meter with totalizer in gallons including supports and thrust rodding. Fittings will be installed in line with wall sleeve to allow for connection from outside main.

Investigation Derived Waste

Investigation derived waste (IDW) accumulated during drilling activities will be collected, containerized, and disposed of off-site. Soil and mud will be transferred to either roll offs for solid waste or to a frac tank for liquids. Development and purge water will be sampled by Resolution and discharged directly to conveyance piping to the GM-38 treatment system. Liquid muds will be transferred to frac tanks located at the staging area.

Decontamination

The decontamination pad at NWIRP Bethpage will be used for the collection of all decontamination-generated fluids. All decontamination fluids will be collected and staged for characterization and subsequent disposal. All decontamination activities will be consistent with the *UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling* (Resolution, 2013).

Surveying

The location of the newly installed well will be surveyed by a New York State licensed surveyor. All surveying activities will be consistent with the *UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling* (Resolution, 2013).

Utility Clearance

Prior to the initiation of intrusive fieldwork, the drilling subcontractor will contact Dig Safely New York to arrange for the location and marking of all underground utilities in the vicinity of the proposed soil boring and recovery well locations, as required by the New York Code of Rules and Regulations (NYCRR) Part 753. The drilling subcontractor will make the one call ticket available for review. In addition to the one call ticket, Resolution will contract a private utility company to confirm utility locations.

In general, prior to advancing the well using a drill rig, the boring location will be hand excavated to a minimum depth of 5 ft bgs with the diameter being greater than the augers to be employed. Excavations will be performed to locate any utilities that may have been marked incorrectly, are privately owned, have been abandoned, were not known to exist, or were not detectable by surface investigation methods. Hand-clearing will be performed by the drilling subcontractor utilizing decontaminated hand augers, shovels, posthole diggers, or other non-mechanical means.

Data Validation

After receipt of analytical laboratory results, Resolution will verify data completeness as specified on Worksheet #34 of the *UFP SAP Addendum – VPB and Recovery Well Installation and Sampling* (Resolution, 2013). To ensure that the analytical results meet the project quality objectives, the laboratory data will undergo verification and validation as cited in Worksheets #34 through #36 and described below. The data usability assessment process is described in Worksheet #37.

All data (100%) will undergo verification and Unites States (U.S.) EPA Stage 2B electronic and manual validation. Prior to data validation, electronic laboratory data will be verified for accuracy against the hardcopy laboratory report and the electronic quality assurance project plan (eQAPP) will be established using the project-specific criteria defined in Worksheets #12, #19, #24, and #28 of the UFP SAP (Resolution, 2013). The laboratory will be requested to resubmit electronic data found to be inaccurate.

During the data validation process, the Resolution Data Validation Assistant (DVA) tool will be used to review method accuracy and precision data from field and laboratory quality control (QC) samples contained in the laboratory electronic data deliverable and to qualify that data according to the project-specific eQAPP. The DVA tool uses EarthSoft's Environmental Quality Information System™ relational database to assemble a series of MS Excel worksheets into a DVA workbook for the validator that provide:

- Data validation QC elements that need review, compared to control limits stored in the project-specific eQAPP.
- Associated sample results for duplicated samples and blanks.
- A place to make the necessary qualifications and result updates directly into an electronic format documentation of qualifications using coded reasons.
- A list of all samples affected by the qualification.

The analytical data report will be manually reviewed for data not provided in the electronic data files (e.g., sample handling, tuning, and calibration). VOCs, SVOCs, 1,4-dioxane (via Selective Ion Monitoring [SIM]), total and dissolved metals, TDS, TSS, ammonia, nitrogen, and BOD will be assessed against the criteria presented in the UFP SAP, Department of Defense (DoD) *General Data Validation Guidelines* (DoD, 2018), and Modules, *National Functional Guidelines for Organic Superfund Methods Data Review* (U.S. EPA, 2017a), *National Functional Guidelines for Inorganic Superfund Methods Data Review* (U.S. EPA, 2017b), and the DoD Quality Systems Manual Version 4.2 (DoD, 2010). The results of these findings will be added to the Excel DVA workbook. The DVA workbook is used to update the project database with the validator's changes, eliminating the manual data entry process and allowing for 100% of data to be reviewed prior to uploading to the project database. The results of the data validation will be documented in reports which will detail any issues impacting the data quality along with qualifications affecting data bias and usability.

Reporting and Schedule

Form 1 results from the analytical lab will be provided to the Navy and regulators as soon as the data are available. Subsequent summary reports including the recovery well installation details, and sampling results will be developed to provide documentation of this investigation. Documentation required to support this project will consist of the following items:

- Scanned copies of the field book during recovery well installation. This may be presented as a separate deliverable.
- Field copies of the boring log
- Groundwater, soil, and air sample log sheets
- Well completion form
- Well development record
- Survey map identifying newly installed recovery well.
- Analytical data summary

The project schedule is presented as Table 4.

References

Department of Defense, 2010. *Quality Systems Manual Version 4.2.* October 2010.

Department of Defense, 2018. *General Data Validation Guidelines.*

Resolution Consultants, 2012. *Health and Safety Plan – Site 1 OU-2 Off Site TCE Groundwater Plume Investigation Naval Weapons Industrial Reserve Plan (NWIRP) Bethpage NY.* May 2012.

Resolution Consultants, 2013. *Uniform Federal Policy Sampling and Analysis Plan (UFP SAP) Addendum – VPB and Monitoring Well Installation and Sampling. Naval Weapons Industrial Reserve Plan (NWIRP) Bethpage NY.* November 2013.

Resolution Consultants, 2014. *Uniform Federal Policy Sampling and Analysis Plan (UFP SAP) Addendum – Inclusion of Additional Target Analytes for Volatile Organic Analyses. Naval Weapons Industrial Reserve Plan (NWIRP) Bethpage NY.* August 2014.

Resolution Consultants, 2016. *Uniform Federal Policy Sampling and Analysis Plan (UFP SAP) Addendum – VPB and Recovery Well Installation and Sampling. Naval Weapons Industrial Reserve Plan (NWIRP) Bethpage NY.* September 2016.

New York State Department of Environmental Conservation, 2010. *DER-10 / Technical Guidance for Site Investigation and Remediation.* May 3, 2010.

United States Environmental Protection Agency 2017a. *National Functional Guidelines for Organic Superfund Methods Data Review.*

United States Environmental Protection Agency 2017b. *National Functional Guidelines for Inorganic Superfund Methods Data Review.*

Tables

Table 1
Recovery Well Groundwater Sampling Program
Page 1 of 1

Boring Number	Drilling Method	Total Depth (feet)(1)	Depth (feet)	Split Spoon Sampling	Groundwater Sampling	Gamma Log	Air Sample (2)
RW4	RC	~655	648	Up to 5	1	No	1

1. Total depth will be approximately 7 feet above the bottom of the vault.
2. Work area summa canister (6 to 8 hours).

RC: Reverse Circulation

Table 2
Recovery Well Analytical Summary
Page 1 of 1

Location	Sample ID	Matrix	Number of Samples		
			VOCs – Quick Turn (1)	Grain size(2)	VOCs – TO 15(3)
RW4	RW4-Soil- MMDDYY XX-XX	Soil	4	~ 5	--
	RW4-GW- MMDDYY XX-XX	Groundwater	~1-	--	--
	RW4-AIR- MMDDYY	Air	--	--	1 per boring

Notes:
1. 24-hour results from local laboratory via method SW846 8260C or equivalent method.
2. 21-day results from Navy-approved laboratory via ASTM422.
3. 21-day results from Navy-approved laboratory via TO-15.

VOCs: Volatile organic compounds
MMDDYY: Sample date in month, day, and year. For example, June 1, 2018 would be 060118.
XX-XX: Bottom of sample interval, in feet. For example, a groundwater sample collected in RW4 at 100 to 102 feet below ground surface on June 1, 2018 would be RW4-GW-060118(100-102).

Table 3
Proposed Recovery Well Installation Summary
Page 1 of 1

Location	VPB	Screened Interval (Feet)	Total Depth (Feet)	Height of Filter Pack Sand (Feet)	Height of Fine Sand (Feet)
RW4	NA	550-650(1)	655(1)	25 feet above screened interval	15 feet above sand

Note:
1. Estimated; final depth to be determined.
   NA – Not Applicable

Table 4
Project Schedule
Page 1 of 1

Task Name	Duration	Start	Finish
Overall Project Schedule – April 2, 2018	**372 days**	**Mon 4/2/18**	**Tue 9/3/19**
Work Plan	140 days	Mon 4/2/18	Fri 10/12/18
Draft Work Plan to Navy	20 days	Tue 4/3/18	Mon 4/30/18
Navy Comments	100 days	Tue 5/1/18	Mon 9/17/18
Final Work Plan	16 days	Tue 9/18/18	Tues 10/9/18
NYSDEC Approval	7 days	Wed 10/10/18	Thu 10/18/18
NYSDEC Withdrawal Permit	45 days	Fri 10/19/18	Thu 12/20/18
Drilling	**249 days**	**Thu 4/26/18**	**Tue 4/9/19**
Development of SOWs	100days	Thu 4/26/18	Wed 9/12/18
Evaluation and Award of SOWs	10 days	Thu 9/13/18	Wed 9/26/18
Mobilization/Fence Modification/GAC/Datalogger deployment	11 days	Mon 1/14/19	Mon 1/28/19
Well installation	18 days	Tue 1/29/19	Thu 2/21/19
Vault installation	3 days	Fri 2/22/19	Tue 2/28/19
Well development	5 days	Wed 2/27/19	Tue 3/5/19
Pumping test APTIM	11 days	Tue 3/19/19	Tue 4/2/19
Demobilization	5 days	Wed 4/3/19	Tue 4/9/19
Data analysis and Reporting	**152 days**	**Mon 3/4/19**	**Tue 10/1/19**
Internal Draft report	45 days	Wed 4/10/19	Tue 6/11/19
Navy Review	30 days	Wed 6/12/19	Tue 7/23/19
Draft Report	20 days	Wed 7/24/19	Tue 8/20/19
Final report	30 days	Wed 8/21/19	Tue 10/1/19

Definitions:

UFP SAP = Uniform Federal Policy Sampling and Analysis Plan
SOW = Scope of Work
NYSDEC = New York State Department of Environmental Conservation
APTIM = Navy Remediation Action Contractor

Figures

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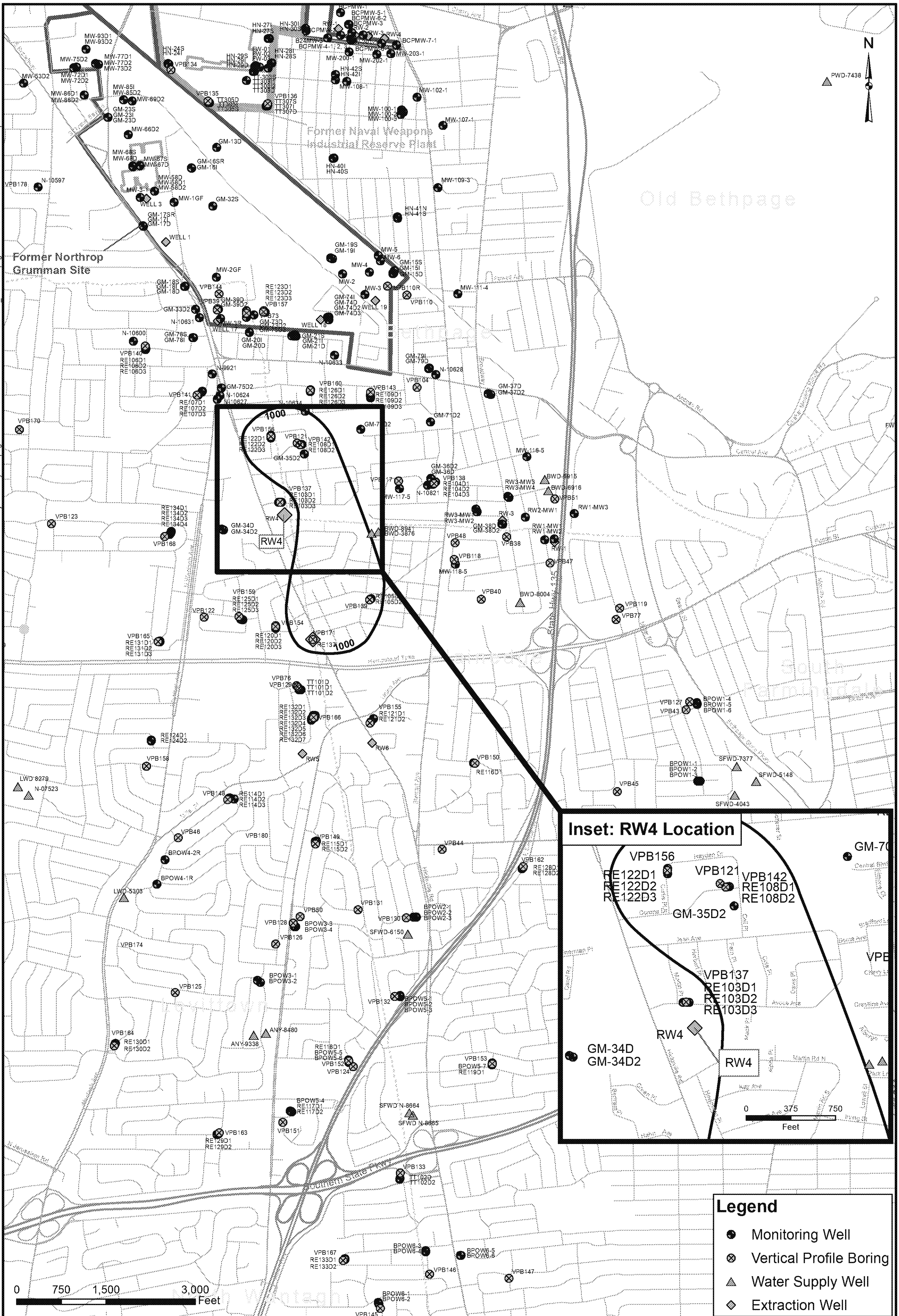
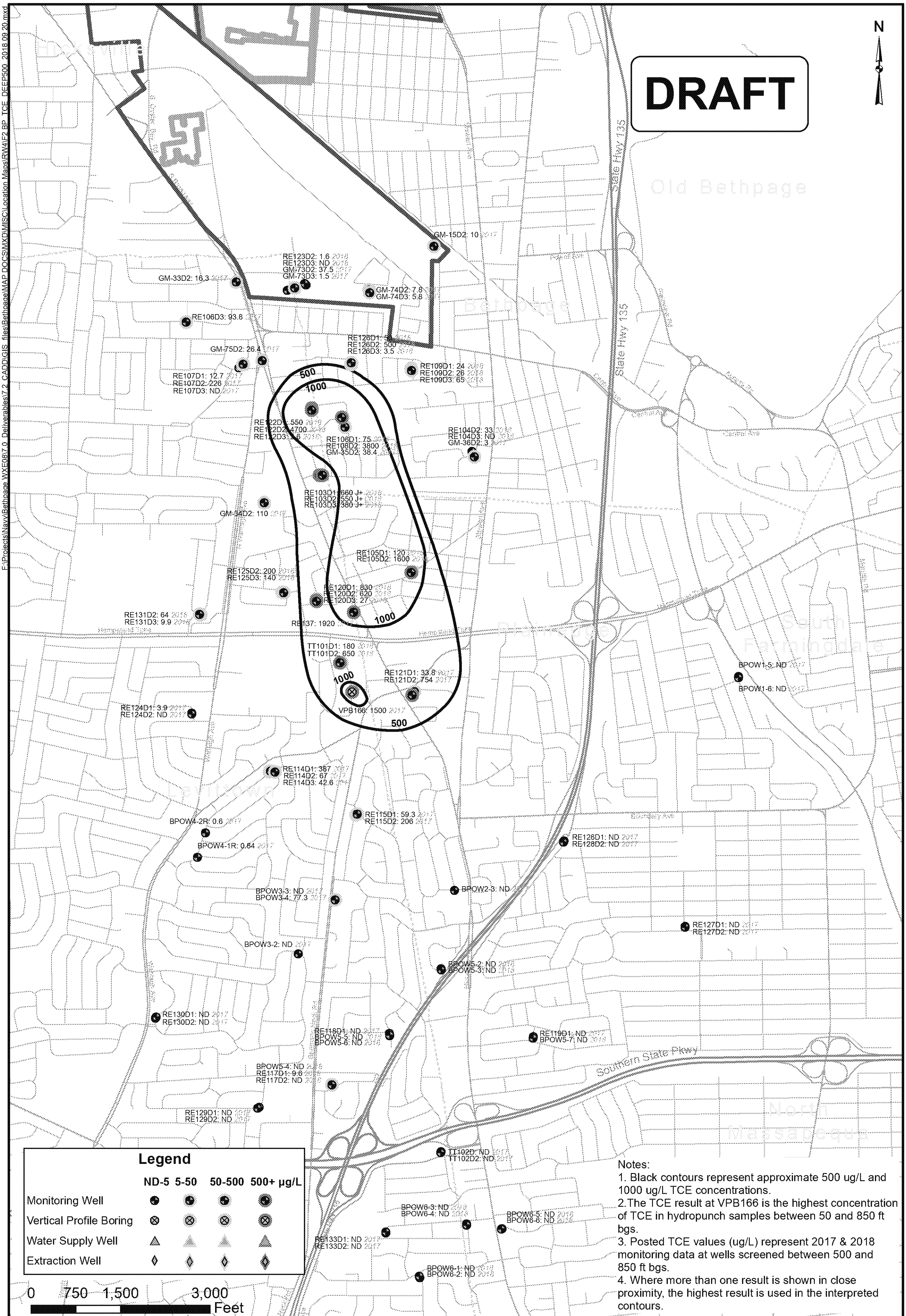


NAVFAC

RW4 LOCATION MAP
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY PS	DATE 9/25/2018
APPROVED BY __	DATE __
FIGURE NO. 1	REV 0


DRAFT
N
Hicksville
Old Bethpage
Bethpage
Plainedge
South Farmingdale
Levittown
North Massapequa
State Hwy 135
Southern State Pkwy
Hempstead Tpke
Central Ave
Boundary Ave
GM-15D2: 10 2017
RE123D2: 1.6 2018
RE123D3: ND 2018
GM-73D2: 37.5 2017
GM-73D3: 1.5 2017
GM-33D2: 16.3 2017
GM-74D2: 7.8 2017
GM-74D3: 5.8 2017
RE106D3: 93.8 2017
RE126D1: 5 2018
RE126D2: 500 2018
RE126D3: 3.5 2018
GM-75D2: 26.4 2017
RE109D1: 24 2018
RE109D2: 26 2018
RE109D3: 65 2018
RE107D1: 12.7 2017
RE107D2: 226 2017
RE107D3: ND 2017
500
1000
RE122D1: 550 2018
RE122D2: 4700 2018
RE122D3: 2.6 2018
RE108D1: 75 2018
RE108D2: 3800 2018
GM-35D2: 38.4 2017
RE104D2: 33 2018
RE104D3: ND 2018
GM-36D2: 3 2017
RE103D1: 660 J+ 2018
RE103D2: 550 J+ 2018
RE103D3: 380 J+ 2018
GM-34D2: 110 2017
RE105D1: 120 2018
RE105D2: 1600 2018
RE125D2: 200 2018
RE125D3: 140 2018
RE120D1: 830 2018
RE120D2: 620 2018
RE120D3: 27 2018
RE131D2: 64 2018
RE131D3: 9.9 2018
RE137: 1920 2017
TT101D1: 180 2018
TT101D2: 650 2018
RE121D1: 33.8 2017
RE121D2: 754 2017
VPB166: 1500 2017
BPOW1-5: ND 2017
BPOW1-6: ND 2017
RE124D1: 3.9 2017
RE124D2: ND 2017
RE114D1: 387 2017
RE114D2: 67 2017
RE114D3: 42.6 2017
RE115D1: 59.3 2017
RE115D2: 206 2017
BPOW4-2R: 0.6 2017
BPOW4-1R: 0.84 2017
RE128D1: ND 2017
RE128D2: ND 2017
BPOW3-3: ND 2017
BPOW3-4: 77.3 2017
BPOW2-3: ND
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RE130D2: ND 2017
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BPOW6-4: ND 2018
BPOW6-5: ND 2018
BPOW6-6: ND 2018
RE133D1: ND 2017
RE133D2: ND 2017
BPOW6-1: ND 2018
BPOW6-2: ND 2018
Legend
ND-5 5-50 50-500 500+ µg/L
Monitoring Well
Vertical Profile Boring
Water Supply Well
Extraction Well
0 750 1,500 3,000
Feet

Notes:
1. Black contours represent approximate 500 ug/L and 1000 ug/L TCE concentrations.
2. The TCE result at VPB166 is the highest concentration of TCE in hydropunch samples between 50 and 850 ft bgs.
3. Posted TCE values (ug/L) represent 2017 & 2018 monitoring data at wells screened between 500 and 850 ft bgs.
4. Where more than one result is shown in close proximity, the highest result is used in the interpreted contours.

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NAVFAC

TCE CONCENTRATIONS IN OU2 GROUNDWATER
FROM WELLS SCREENED 500-850 FT BGS
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE08
APPROVED BY PS	DATE 9/25/2018
APPROVED BY __	DATE __
FIGURE NO. 2	REV 0

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NAVFAC

RW4 AERIAL MAP
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 8/8/2018
APPROVED BY: —	DATE: —
FIGURE NO.: 3	REV: 0

ED_002631A_00011368-00020

Attachments

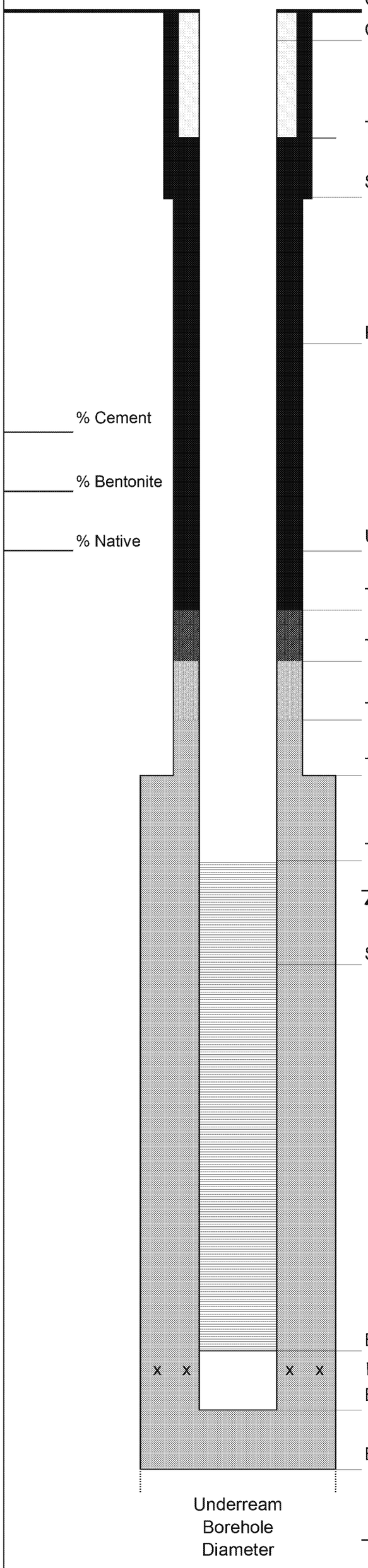
Attachment A

Well Construction Detail

RESOLUTION CONSULTANTS

Client:	NWIRP - Bethpage	Project Number: 60508906	**WELL ID: RW4**
Site Location:	NWIRP BETHPAGE, NY		
Well Location:			*Date Installed:*
Method:	Reverse Rotary		*Inspector:*
Coords:	Northing:	Easting:	*Contractor:* Delta Well & Pump

RECOVERY WELL CONSTRUCTION DETAIL



	Depth from GS (feet)	Elevation (feet amsl)
Ground surface	0	
Clean backfill		
Top of Grout	0	
Surface casing (installed 12/1/16)		
Inside Diameter (ID)		
Type of Material: Steel		
Riser Pipe		
Length		
Inside Diameter (ID)		
Type of Material: Sch. 40 153P Black Steel		
% Cement		
% Bentonite		
% Native		
Upper Borehole Diameter 18"		
Top of Bentonite Seal		
Top of Secondary Sand Pack		
#00 Sand		
Top of Primary Sand Pack		
#30 Sand		
Top of Underream		
Top of Screen		
Stabilized Water Level		
Screen:		
Length: 100"		
Inside Diameter (ID)		
Type of Material: 304SS Johnson Hi-Flow		
Slot size: 0.030"		
Bottom of Screen		
Well Centralizer at 747'		
Bottom of Sump		
12" ID Threaded Cap		
Bottom of Borehole		
Underream Borehole Diameter: 24"		

Signature _____ Date _____